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A DESCRIPTIVE AND CORRELATIONAL STUDY OF VARIABLES RELATED TO SUCCESS IN THE SAN BERNARDINO VALLEY COLLEGE TWO-YEAR REGISTERED NURSE PROGRAM.

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THE PRIME CRITERION OF SUCCESS OF A NURSING PROGRAM IS OCCUPATIONAL PERFORMANCE OF GRADUATES. AS AN INTERMEDIATE STEP, THE AUTHOR INVESTIGATED THE RELATIONSHIP OF CERTAIN PERSONAL CHARACTERISTICS (AGE, SEX, MARITAL STATUS, NUMBER OF CHILDREN, NUMBER OF BROTHERS AND SISTERS, FATHER'S AND MOTHER'S EDUCATION, AND SCHOOL AND COLLEGE ABILITY TEST SCORES) AND PRENURSING FACTORS (GRADES IN HIGH SCHOOL AND IN PRENURSING COURSES AND SEMESTERS OF COLLEGE PRIOR TO NURSING TRAINING) TO CRITERION VARIABLES OF SEMESTERS OF NURSING COMPLETED, GRADES IN THE NURSING PROGRAM AND SCORES ON TESTS OF THE NATIONAL LEAGUE FOR NURSING AND THE CALIFORNIA STATE BOARD OF NURSE EXAMINERS. SUBJECTS WERE 81 STUDENTS IN THREE NURSING CLASSES AT SAN BERNARDINO VALLEY COLLEGE. SOME PREDICTORS (AGE, SCAT-VERBAL, PRENURSING COURSES, HIGH SCHOOL CHEMISTRY) SHOWED LOW TO MODERATE CORRELATION WITH STATE BOARD EXAMINATIONS AND NURSING GRADES. GENERALLY, PERSONAL DATA, HIGH SCHOOL GRADES (EXCEPT SCIENCE) AND QUANTITATIVE ABILITY APPEARED UNRELATED TO SUCCESS. OLDER STUDENTS EARNED SIGNIFICANTLY HIGHER SCORES ON STATE BOARD EXAMINATIONS. ANALYSIS OF REGRESSION OF FOUR VARIABLES (SCAT-VERBAL, PRENURSING GRADES, AGE, AND HIGH SCHOOL CHEMISTRY GRADES) ON STATE BOARD SCORES ACCOUNTS FOR ONLY 35 PERCENT OF THE VARIANCE IN SUCH SCORES. THERE IS A NEED FOR FURTHER STUDY, INCLUDING OTHER PREDICTORS. (WO)

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by Dale C. Carlson

June 1, 1967

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INTRODUCTION

In the fall of 1965, the Nursing Department of San Bernardino Valley College, assisted by the Counseling Department, initiated a research program. This project was designed to validate, quantify, and refine the process of selecting nursing students. By identifying those variables most closely related to success in the nursing program and combining them with optimal weights to select students with the highest chances for success, it seems reasonable to expect fewer absolute failures, higher average scores on State Board Examinations, and greater satisfaction with the selection process.

The range of variables under consideration in this initial study is limited to the information routinely gathered as students apply for admission to and proceed through the nursing program. This "ex post facto" analysis is focused upon measures of intellectual ability and corresponding intellectual achievement. Except for identifying information, little attention is given to the exceedingly important, but nebulous area of personality characteristics and traits.

The second obvious limitation of this part of the study is the necessary use of success on the California State Board Examination as a criterion. Important as this subcriterion appears, the ultimate standard for evaluating the nursing program, must be some measure of occupational success.

The second phase of the study, not reported in this paper, is an attempt to apply personality data to selection decisions. Measures of personality characteristics, have been administered to students in four nursing classes thus far. Preliminary analysis is soon to be undertaken, searching for relationships between personality characteristics and measures of clinical and academic success in the nursing program. Since grades are only remotely related to occupational success (Richards, 1965), it is hoped that personality measures can be used to predict both short-term and long-range occupational success. A look at previous research in this area,(Taylor, 1965),should caution us not to set our expectations too high. Few studies can claim unequivocal findings and few of those findings are observed in replicating studies.

PROCEDURES

The sample for this study consisted of the students who were admitted into the first four classes under the two-year program. These are the 1963 through the 1966 graduating classes and the students who would have graduated at that time, had they completed their course of study. Most of the analyses use only the 61 students of the first three classes, because of the necessary delay in receiving State Board scores for the 1966 class.

The variables included in this study could be placed in the three categories of personal information, predictor or pre-nursing variables, and criteria. Enumerated, they are:

1. Personal Data

    a. age
    b. sex
    c. marital status
    d. number of children
    e. number of brothers
    f. number of sisters
    g. father's education
    h. mother's education
    i. SCAT score

2. Pre-Nursing Data

   a. high school grades
   b. grades in pre-nursing courses
   c. number of semesters of college prior to admission

3. Criterion Variables

   a. scores on National League For Nursing Achievement Tests
   b. semesters of nursing completed
   c. scores on California State Board Examinations
   d. grades in the nursing program

RESULTS

Total Sample

Continuous Variables

Descriptive analysis. A description of all students who entered the 1963 through 1965 graduating classes can be found in Table 1. The means and standard deviations are given for all continuous variables studied.

It can be seen that most students are about 26 years old at entrance, average less than one child each,since more than half are single, have at least two siblings, are reared by parents of at least ninth-grade education, spend nearly two semesters in pre-nursing courses prior to admission in the nursing program,,and spend about four and a half semesters in the nursing program before graduation.

In scholastic ability, entering students scored slightly higher on the Verbal scale of the School and College Ability Test than on the Quantitative scale. The average scores in terms of national percentiles were 71 and 60 respectively.

On the National League For Nursing Achievement Test, the students scored lowest on the psychiatric section, (41st percentile), and highest on the diet therapy part, (57th percentile).

Average California State Board Scores ranged from 514 on Medical to over 558 on the Obstetrics section with an average of 535.1 for all parts.

Table 1

All Nursing Students Who Entered the Graduating Classes of 1963-65

Variable	No.	Mean	S D
Age	81	25.94	9.60
Number of children	81	.81	1.33
Number of brothers	81	1.08	1.19
Number of sisters	81	1.18	1.18
Number of siblings	81	2.27	1.78
Father's education	81	9.53	2.01
Mother's education	81	9.95	1.79
Semesters prior to admission	81	1.71	1.75
Semesters of nursing	81	4.45	2.21
SCAT - Vocabulary	79	39.34	7.80
SCAT - Quantitative	79	35.60	7.50
SCAT - Total	79	69.50	12.40
NLN Anatomy & Physiology	65	76.50	11.00
NLN Microbiology	64	76.25	12.30
NLN Obstetrics	61	78.16	8.80
NLN Nursing of children	59	74.50	10.10
NLN Psychiatric	59	70.10	9.40
NLN Medical & Surgical	56	79.00	9.30
NLN Dietetic	57	79.30	10.00
State Obstetrics	56	558.50	113.94
State Nursing of children	56	535.20	84.24
State Psychiatric	56	534.12	89.64
State Medical	56	514.68	89.64
State Surgical	56	534.12	96.12
H S Grade Point Average	56	2.67	.45
H S Chemistry	51	2.02	.80
H S Biology	49	2.80	.80
H S Math	20	2.60	.73
H S Algebra	55	2.24	.73
H S English	59	2.58	.55
Pre-Nursing GPA	53	2.48	.50
Total College GPA	81	2.56	.64
Anatomy & Physiology	75	2.56	.75
Microbiology	70	2.63	.77
English 1a	40	2.33	.84
Obstetrics	64	2.93	.71
Nursing of children	63	2.72	.68
Psychiatric	56	3.07	.65
Medical & Surgical	77	2.54	.68
Dietetic	60	2.55	.79
Chemistry	17	2.30	.66
Math 50	7	3.58	.49

In high school they earned a low "B-" average. In courses thought to be important to success in college, the students ranged from a "C" average in chemistry to almost a "B" average in the related science of biology.

In courses taken prior to the nursing program, the group earned grades which averaged between "B" and "C". Since grades in nursing courses were slightly higher, the total grade point average goes up to 2.56. Concordant with the State Board scores, lowest grades were earned in the medical and surgical courses and the highest in obstetrics.

Correlational analysis. The complete matrix of intercorrelations for all continuous variables and sex is presented in Table 2. All correlation coefficients were computed by the Pearson Product-Moment Method unless otherwise indicated. All coefficients printed in red numerals are sufficiently large to be significant at the .05 level of confidence. All others are low enough to have occurred purely by random deviation more often than five percent of the time between truly uncorrelated variables. Since the primary purpose of this correlational analysis is to identify variables, State Board scores and grades in nursing will be considered first. The third criterion, nursing program completion, is considered later where dropouts are compared with graduates.

Searching for relationships with State Board scores, it can be seen that coefficients with age vary in the .30's with an average of .35. Older students score slightly higher on State Board scores. Correlations with sex are very low. However, all are positive, indicating slight superiority for women.

Personal variables, such as number of children, number of brothers and/or sisters, and educational level,attained by parents are not related to success on State Boards. Nor is State Board performance related to the

	Age	Sex	No. of ch	No. of bros	No. of sis.	No. of sibl.	Father's ed.	Mother's ed.	Sem. prior to admis.	Sem. of nursing compl.	SCAT - V	SCAT - Q	SCAT - T	NLN - A & P	NLN - Micro.	NLN - Ob.	NLN - Nsg. of ch.	NLN - Psy.	NLN - M & S	NLN - Diet
[illegible]	-26																			
[illegible]ber of children	73	00																		
[illegible]ber of brothers	02	-23	11																	
[illegible]ber of sisters	10	12	05	11																
[illegible]ber of siblings	08	07	11	75	74															
[illegible]ther's education	-15	07	-16	-22	06	-19														
[illegible]ther's education	-28	18	-21	-19	-29	-29	45													
[illegible]esters prior to admission	41	-07	34	-11	07	02	00	-29												
[illegible]esters of nursing	07	03	24	09	09	13	-16	-18	09											
[illegible]AT - Vocabulary	21	-15	16	03	20	15	08	-04	10	01										
[illegible]AT - Quantitative	-28	-33	-27	00	-13	08	02	14	-35	03	23									
[illegible]AT - Total	02	-28	01	03	08	07	04	08	-17	03	64	72								
[illegible]N - Anatomy & Physiology	26	-13	18	09	-12	02	05	17	03	06	39	24	44							
[illegible]N - Microbiology	23	05	18	14	01	09	12	20	03	12	48	15	43	74						
[illegible]N - Obstetrics	34	20	32	11	22	23	-16	00	07	07	41	02	32	50	48					
[illegible]N - Nursing of children	38	09	27	12	11	16	08	04	03	19	40	13	44	59	49	48				
[illegible]N - Psychiatrics	30	15	22	04	10	10	15	08	15	14	45	01	36	45	46	46	54			
[illegible]N - Medical & Surgical	33	05	29	02	01	00	-15	-11	19	01	37	02	26	54	49	46	65	56		
[illegible]N - Dietetics	27	20	19	-15	16	01	06	03	01	-19	33	01	23	50	38	65	45	40	53	
[illegible]ate Board - Obstetrics	40	27	34	00	08	06	11	20	11	20	42	04	26	54	37	67	58	46	60	65
[illegible]ate Board - Nursing of children	32	15	26	06	01	03	-20	07	08	-21	31	07	27	47	49	61	57	42	49	50
[illegible]ate Board - Psychiatrics	39	02	35	05	02	02	-13	-12	12	01	38	03	24	51	37	59	54	40	51	47
[illegible]ate Board - Medical	22	10	11	01	02	00	02	01	04	-16	52	13	45	49	47	50	56	46	52	62
[illegible]ate Board - Surgical	44	02	32	17	09	04	-19	05	07	-18	42	07	31	58	45	67	62	48	59	58
[illegible]gh School Grade Point Average	-23	03	-15	12	06	02	01	05	-21	17	03	40	27	13	03	04	06	15	07	04
[illegible]gh School - Chemistry	04	31	-03	-02	-12	-07	00	-06	-12	00	-10	20	-08	18	08	24	20	-07	04	37
[illegible]gh School - Biology	05	-03	04	-03	00	-02	-02	-05	00	-09	18	25	33	24	09	25	28	16	-04	10
[illegible]gh School - Algebra	-07	-08	-06	15	35	37	-13	-13	-11	20	-06	10	17	00	-02	-05	10	00	-05	-14
[illegible]gh School - English	-17	27	-05	-07	-04	-08	15	-01	-17	-12	00	27	24	-02	-16	-09	-09	-15	-11	33
[illegible]e-Nursing Grade Point Average	28	02	15	00	20	12	-25	-20	-06	34	19	11	18	23	23	37	39	28	24	35
[illegible]lley College Grade Point Average	46	06	36	09	13	15	-18	-23	13	49	17	09	18	48	46	59	62	32	45	51
[illegible]ade - Anatomy & Physiology	33	-02	30	-01	-12	-07	00	-13	17	37	23	05	19	61	55	49	42	32	38	58
[illegible]ade - Microbiology	19	00	-13	-04	-02	-01	-11	-15	20	26	21	14	21	40	47	37	36	29	37	31
[illegible]ade - English	32	-02	36	-03	-04	-04	-04	-03	00	25	39	-10	16	54	74	60	55	53	44	50
[illegible]ade - Obstetrics	51	-09	43	-05	-04	-01	-06	-05	14	-08	14	-14	-08	45	43	43	39	28	40	38
[illegible]ade - Nursing of children	41	-02	20	-03	13	11	-01	-04	-05	-01	34	-01	33	50	37	59	57	32	34	57
[illegible]ade - Medical & Surgical	50	-05	33	-05	16	14	-10	-21	12	42	22	-03	20	53	56	60	59	40	50	57
[illegible]ade - Psychiatric	41	-13	27	08	16	17	03	06	13	07	37	19	33	41	29	35	50	27	15	27
[illegible]ade - Dietetics	55	02	40	02	06	02	06	13	18	06	40	-15	24	50	45	56	58	33	50	55

Table 2

Intercorrelation Matrix for

Forty Variables for All Students Entering the

1963-1965 Graduating Classes.

Red Numerals = P<.05

Decimals have been omitted.

	SCAT - T	NLN - A & P	NLN - Micro.	NLN - Ob.	NLN - Nsg. of ch.	NLN - Psy.	NLN - M & S	NLN - Diet	St. Bd. - Ob.	St. Bd. - Nsg. of ch.	St. Bd. - Psy.	St. Bd. - Med.	St. Bd. - Surg.	H.S. G.P.A.	H.S. - Chem.	H.S. - Biol.	H.S. - Alg.	H.S. - Eng.	Pre-Nsg. G.P.A.	V.C. G.P.A.	Gr. - A & P	Gr. - Micro.	Gr. - Eng.	Gr. - Ob.	Gr. - Nsg. of ch.	Gr. - M & S	Gr. - Psy.	Gr. - Diet.
NLN - A & P	74																											
NLN - Micro.	50	48																										
NLN - Ob.	59	49	48																									
NLN - Nsg. of ch.	45	46	46	54																								
NLN - Psy.	54	49	46	65	56																							
NLN - M & S	50	38	65	45	40	53																						
NLN - Diet	54	37	67	58	46	60	65																					
St. Bd. - Ob.	47	49	61	57	42	49	50	67																				
St. Bd. - Nsg. of ch.	51	37	59	54	40	51	47	58	54																			
St. Bd. - Psy.	49	47	50	56	46	52	62	66	65	60																		
St. Bd. - Med.	58	45	67	62	48	59	58	78	75	64	74																	
St. Bd. - Surg.	13	03	04	06	15	07	04	05	03	07	05	03																
H.S. G.P.A.	18	08	24	20	-07	04	37	31	28	27	27	19	36															
H.S. - Chem.	24	09	25	28	16	-04	10	21	-03	-07	29	15	31	-30														
H.S. - Biol.	00	-02	-05	10	00	-05	-14	-06	00	-12	00	-10	44	-22	-21													
H.S. - Alg.	-02	-16	-09	-09	-15	-11	33	14	12	16	21	-04	68	40	35	20												
H.S. - Eng.	23	23	37	39	28	24	35	29	34	40	42	40	11	16	01	06	04											
Pre-Nsg. G.P.A.	48	46	59	62	32	45	51	49	49	51	50	57	24	33	33	-15	07	78										
V.C. G.P.A.	61	55	49	42	32	38	58	55	41	48	58	48	30	26	44	11	21	59	77									
Gr. - A & P	40	47	37	36	29	37	31	33	26	42	47	35	12	-12	31	-07	-07	60	59	66								
Gr. - Micro.	54	74	60	55	53	44	50	48	25	36	58	41	16	34	31	-22	-09	29	61	-53	-62							
Gr. - Eng.	45	43	43	39	28	40	38	57	38	48	40	48	-06	15	23	20	19	45	64	65	44	57						
Gr. - Ob.	50	37	59	57	32	34	57	63	51	52	57	62	10	15	17	12	13	52	63	59	40	45	59					
Gr. - Nsg. of ch.	53	56	60	59	40	50	57	63	58	48	62	62	24	28	38	-11	-01	65	82	76	57	55	64	73				
Gr. - M & S	41	29	35	50	27	15	27	37	39	51	26	45	10	19	09	01	20	44	52	50	36	18	30	60	52			
Gr. - Psy.	50	45	56	58	33	50	55	51	46	61	56	58	09	24	17	01	03	60	72	54	61	68	58	65	68	38		

length of time required to prepare for or complete the nursing program.

Verbal performance on the SCAT bears substantial relationship to State Board performance. The average correlation coefficient is .41.* SCAT Quantitative coefficients are negligible. Hence, total score is a poorer predictor of State performance than the Verbal score.

Scores on the National League For Nursing Achievement Tests are highly related to State Boards as expected, since they are quite similar in content and format. The average coefficient is .52.

The average of high school grades is not related to State Board performance, nor are most specific subject grades. The most expected relationship, that of chemistry with State Board scores, averages only .26.

There is a greater relationship between grades in pre-nursing courses and State Board scores. The average coefficient is .37. Anatomy and physiology grades appear to have the highest relationship of all pre-nursing courses. Not enough students took Chemistry 2 or Math 50 for analysis.

Grades earned in the nursing program are not surprisingly substantially correlated with State Board performance; many coefficients being above .60.

*SCAT-Verbal score was a critical factor in the selection of these students. Since they were a higher-than-average group, their variability in scores was less than it would have been in a random group of college students. When the correlation coefficient is corrected for this restriction in range, it approximated .55.

Table 3

Analysis of Regression of Four Predictor Variables
On California State Board Scores

Variable	Mean	Standard Deviation	Correlation with State Board Exam Scores	Beta Coefficients	Regression Weights
SCAT	39.34	7.8	.41	.3028	3.62
Pre-Nursing GPA	2.485	.50	.37	.2146	40.04
Age	25.94	9.6	.35	.2150	2.09
H. S. Chem Grades	2.02	.80	.26	.1828	21.32

Table 4

Four Indicators of the Degree of Relationship Between
California State Board Scores and the Four Predictor Variables

$R_{1.2345}$	.539*
$SE_{1.2345}$	76.5
E	15.7
R^2	.326

*After shrinkage correction for small samples

Considering nursing grades as the criterion, it can be noted that age is differentially related to certain courses, ranging from .19 in microbiology to .51 in obstetrics. As with State Board scores, the other personal information failed to be predictive.

The number of semesters of the nursing program completed is not as correlated as it appears since drop-outs were included in the sample.

SCAT-Verbal bears less relationship to nursing grades than to State Board scores. Quantitative performance is unrelated to scholastic success, bringing correlations for total scores correspondingly lower.

As could be expected, nursing grades are substantially correlated with National League For Nursing Achievement scores, with many coefficients in the .50's and some exceeding .60.

High school performance is unrelated to nursing grades, as well as State Board performance. High school chemistry bears a lower relationship to nursing grades than to State Board scores.

Regression analysis. In July, 1966, the nursing selection committee was forced to select thirty students from over ninety applicants. Since this selection problem was approaching the point where actuarial methods are helpful, the preliminary results of this study were analyzed and applied as described below.

Using an average State Board score as the criterion and the four variables of SCAT-Verbal, pre-nursing GPA, age,and high school chemistry grade as predictors, all applicants were ranked in order of their predicted score. This information was supplied to the committee as they met to select the classes of Fall, 1966 and Spring, 1967.

Table 3 shows the results of this regression analysis. The beta coefficients are found in column five and the raw score regression weights in column six. By applying these regression weights, the predicted average

State Board scores for applicants were computed by the following formula: X_1 = 179 + 3.62 (raw Scat-Verbal score) + 40.04 (pre-nursing GPA) + 2.09 (age) + 21.32 (high school chemistry grade.)

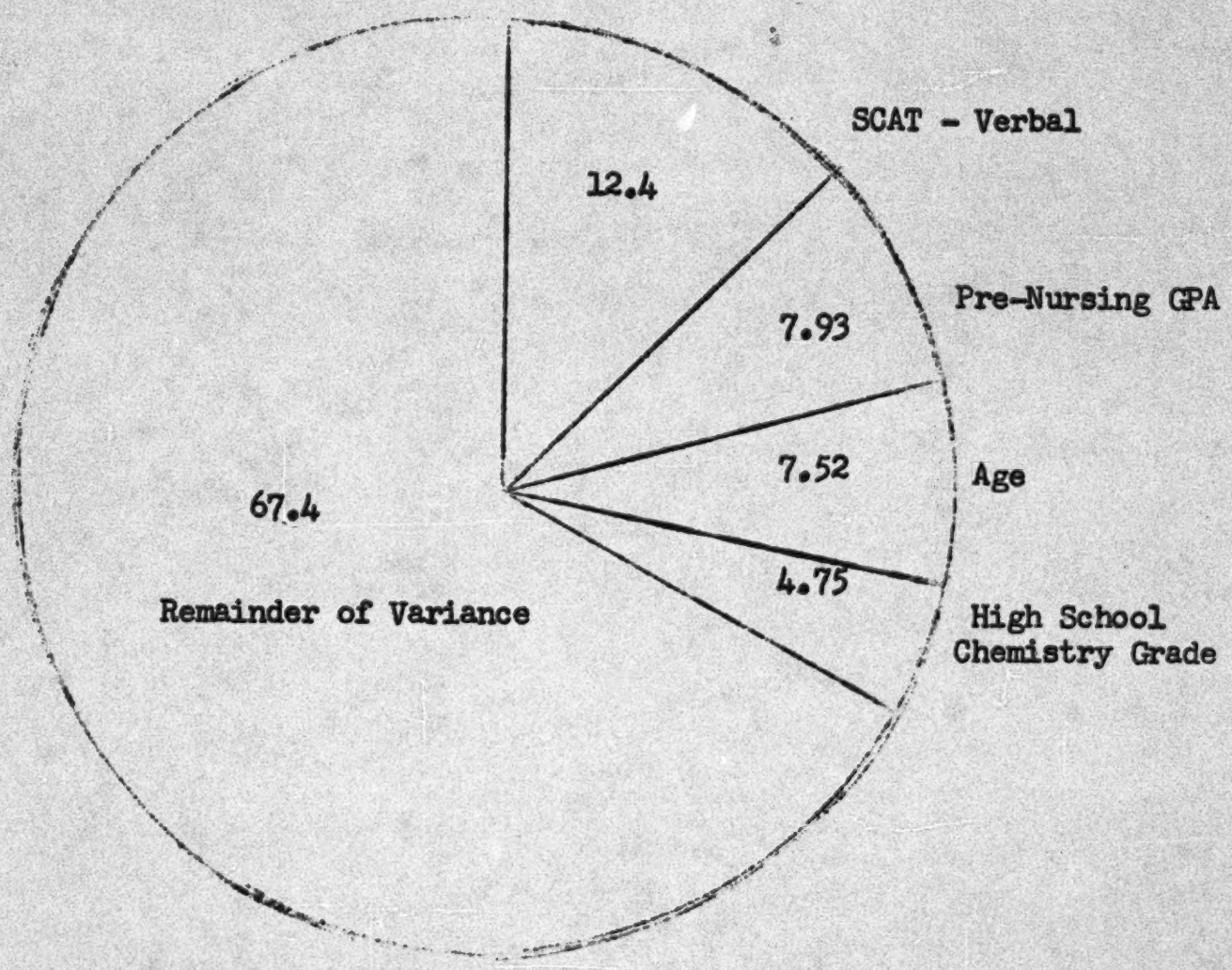
The multiple correlation coefficient between State Board scores and the best combination of the four predictor variables is .539 as shown in Table 4. The standard error of multiple estimate is one means of expressing the usefulness of such a coefficient. It indicates about how far the predicted values would deviate from obtained ones. The standard error of any score predicted by the previous formula is 76.5. This means that the chances are 2 out of 3 that the actual average State Board score will be within the limits: predicted score plus or minus 76.5 points. Or to increase the confidence of the prediction, the chances are 95 out of 100 that the obtained score would be within two standard errors or 149.94 points of the predicted score.

Another statistical tool used to express the value of the four predictor variables is the index of forecasting efficiency, to be seen as "E" in Table 4. "E" for this problem is 15.7, which means that the errors of prediction are only 15.7 percent less than they would be without the knowledge and use of the relationships of the four predictor variables with the criterion.

The coefficient of multiple determination, R^2, for this problem is .326. This is the percentage of variance associated with or predicted by the four predictor variables with the regression weights used. The proportion of this variance accounted for by each predictor is represented in Figure 1. Only about one-third of all variation in State Board scores can be accounted for by the four predictors, leaving over two-thirds yet

Figure I

Proportion of Variability in California State Board Scores Predictable by the Four Predictor Variables.



to be explained and measured by further research.

Non-Continuous Variables

Table 5 shows the attrition rate and State Board success ratio for the four graduating classes. From 60 to 74 percent of the entering students actually completed the program. Of those students who finished, the proportion who failed any one part of the State Board Examinations ranged from 0 to 11 percent.

The reasons students withdrew from the program are summarized in Table 6. Academic failure ostensibly accounted for nearly one-half of all those who withdrew. It is interesting to see that none of the students listed marriage or financial problems as the main reason. Other reasons were ill health, moving from area, dislike for nursing, and failure in clinical area.

Table 7 classifies all students according to the three non-continuous variables of sex, marital status, and completion of program. It can be seen that nine of the students were men and 72 were women. Roughly, the same proportion of each sex completed the nursing program; six out of nine men and fifty out of seventy-two women.

Observing the single and married students, it appears that a greater proportion of married students completed the program than single students. This hypothesis was verified by a Fisher Exact Probability Test completed on the data in Table 8. The probability of these proportions occuring by chance is slightly higher than one in one hundred.

Sub - Group Analyses

Inter-Group Comparisons

The last step in the search for relationships was a series of sub-group comparisons. Five of these are presented here. The first two groups,

Table 5

1963-1966 Graduating Classes According to Attrition and Failures on California State Board Examinations

Variable	1963	1964	1965	1966	Average
Number that entered program	24	30	32	38	31
Number that completed program	18	18	22	25	20.75
Per cent that completed program	74	60	68	65	66.75
Number of students who failed any part of the California State Board Exam	0	2	2	2	1.5
Per cent of students who failed any part of the California State Board Exam	0	11	9	8	7

Table 6

Analysis of Withdrawals From Graduating Classes of 1963-66

Reason for Withdrawal	No.	%
Academic Failure	11	44
Marriage	0	0
Finances	0	0
Health	5	20
Moved Away	3	12
Dissatisfied with Nursing	4	16
Clinical Failure	2	8
Total	25	100

Table 7

Analysis of Attrition According to Sex and Marital Status

Marital Status	Men		Women		Total
	Have Completed Program	Have Not Completed Program	Have Completed Program	Have Not Completed Program	
Single	1	1	24	18	44
Married	5	1	17	3	26
Separated					0
Divorced			2	1	3
Widowed			1		1
Married during program		1	5		6
Sep. or div. during program			1		1
Total	6	3	50	22	81

Table 8

Fourfold Table Showing Relationship
Between Marital Status and Attrition for Both Sexes

	Married	Single
Have Completed Program	22	25
Have Not Completed Program	4	19

P = .011756

differentiated by sex and graduating class, are presented with a view toward curiousity - satisfaction rather than predictive information. The third comparison, drop-outs versus graduates, forms the main presentation of information regarding this criterion of program completion. The last two sets of dichotomies, age and marital status, are followed by a correlation analysis of each sub-group.

Classes. Table 9 shows the sample size, mean, and standard deviation for each group of entering students, some of whom graduated in the four years of 1963 - 1966. Since differences carry no implication for selection, they were not tested for significance.

Sex groups. Table 10 shows the sample size, mean, and standard deviation of all continuous variables for men and women. The difference between means is given in the right-hand column. If this difference appeared to be substantial, it was tested by the statistic number as Student's "t". If the difference was large enough to meet the .05 level of confidence, it was marked with one asterisk (*). If the difference was large enough to occur less than once in one hundred times in a pure chance situation, it was marked with two asterisks. In comparisons where the size of either sample fell below 20, the difference was tested for significance by the non-parametric Mann Whitney "U" Test and marked as indicated.

Observing Table 10, it can be seen that male applicants were older, had higher SCAT scores, yet scored lower on three parts of the State Board Examination, especially on the obstetrics portion. Men were not unlike women on any other variable.

Attrition groups. The third and most obvious criterion of success in nursing is completion of the program. Table 11 compares those students who completed the program with those who withdrew. The groups are similar

Table 9

Means and Standard Deviations On All Variables Studied for the Four Graduating Classes

Variable	Mean								Standard Deviation			
	No.	1963*	No.	1964	No.	1965	No.	1966	1963	1964	1965	1966
Age	18	28.94	17	26.70	21	26.10	34	26.02	11.68	9.32	9.11	10.30
No. of brothers	18	.94	17	1.17	21	.33	23	1.47	1.07	1.14	1.12	.77
No. of sisters	18	1.16	17	1.52	21	.09	28	1.42	1.34	1.33	1.01	.86
No. of siblings	18	2.11	17	2.70	21	1.42	31	2.38	1.72	1.83	1.39	1.03
No. of children	18	.72	17	1.29	21	.14	15	2.66	1.09	1.09	1.42	1.69
Father's education	18	9.50	17	8.58	21	9.71	33	11.81	1.89	1.81	1.66	2.52
Mother's education	18	10.27	17	8.70	21	10.04	32	11.96	1.32	1.77	1.55	2.36
Sem. prior to admis.	18	1.11	17	1.70	21	1.42	25	1.80	1.62	1.67	1.98	1.20
Sem. of nursing	18	4.94	17	6.23	21	5.14	33	3.57	1.12	.64	.71	1.72
SCAT - Vocabulary	16	39.50	17	40.30	21	39.02	33	35.68	6.16	8.40	7.85	7.10
SCAT - Quantitative	16	30.98	17	31.58	21	31.58	33	26.83	5.44	8.32	7.56	6.72
SCAT - Total	16	69.17	17	72.74	21	68.99	33	63.61	9.80	11.76	12.24	13.13
NLN - A & P	18	77.72	17	77.50	21	74.63	23	56.37	12.36	10.08	10.24	16.10
NLN - Micro	18	76.78	17	79.24	21	76.60	23	76.98	11.94	8.88	13.18	9.83
NLN - Ob	18	82.12	17	79.60	21	75.21	24	66.00	7.32	8.46	8.37	8.81
NLN - Nsg. of ch.	18	77.14	17	76.42	21	73.49	24	76.50	9.24	8.76	8.14	8.24
NLN - Psych.	18	71.14	17	71.14	21	69.78	24	69.00	6.72	8.82	10.65	13.51
NLN - M & S	18	79.48	17	79.24	21	78.64	24	72.00	9.36	8.40	9.72	9.15
NLN - Diet	18	83.80	17	77.50	21	77.21	24	83.00	9.84	7.92	10.54	9.63
St. Bd. - Ob	18	585.00	17	507.50	21	527.31	24	440.26	110.70	110.70	97.03	106.27
St. Bd. - Nsg. of ch.	18	551.50	17	507.50	21	493.89	24	528.01	63.25	66.42	89.96	93.42
St. Bd. - Psych	18	528.40	17	526.40	21	504.20	24	516.78	88.55	105.84	87.53	90.18
St. Bd. - Med.	18	531.70	17	482.40	21	493.89	24	532.50	71.50	93.96	81.86	94.77
St. Bd. - Surg.	18	555.90	17	494.82	21	514.46	24	430.91	81.40	108.00	83.86	91.74

* Data presented for 1963-65 are based on graduates only, whereas all beginning students are included in the 1966 group.

(Continued on next page)

Variable	Mean								Standard Deviation			
	No.	1963	No.	1964	No.	1965	No.	1966	1963	1964	1965	1966
H S - G.P.A.	14	2.88	14	2.99	17	1.56			.34	.58	.41	
H S - Chem.	12	2.34	11	2.00	12	1.83	19	2.47	.74	.60	.89	.67
H S - Biology	11	3.19	10	2.70	12	2.75	14	2.57	.71	.78	.82	.82
H S - Math	2	3.00	3	2.00	7	2.71	1	2.00	.00	.00	.88	.00
H S - Algebra	13	2.24	11	2.37	15	2.33	17	2.47	.69	.64	.86	.77
H S - English	13	2.77	12	2.59	15	2.33	21	2.85	.42	.75	.47	.46
Pre-Nsg. G.P.A.	9	2.80	12	2.78	17	2.39	20	1.94	.28	.43	.59	.40
Total G.P.A.	18	2.99	17	2.86	21	2.62	24	2.66	.44	.50	.37	.49
Grade - A & P	18	2.95	17	2.71	21	2.66	31	2.25	.62	.57	.71	.80
Grade - Micro.	18	2.73	17	2.95	21	2.57	27	2.51	.80	.80	.65	.78
Grade - English 1a	6	2.50	6	2.84	10	2.40	24	2.54	.76	.68	.80	.76
Grade - Ob.	18	3.28	17	2.89	21	2.85	26	2.77	.55	.75	.70	.74
Grade - Nsg. of ch.	17	3.24	17	2.71	21	2.42	28	2.50	.42	.74	.58	.56
Grade - M & S	18	3.17	17	2.77	21	2.52	25	2.64	.68	.64	.58	.79
Grade - Diet.	18	2.89	17	2.71	21	2.23	25	2.40	.73	.89	.60	.63
Grade - Chem.			17	2.00	6	2.50	11	2.54		.00	.50	.78

Table 9 (Continued)

Means and Standard Deviations On All Variables
Studied For The Four Graduating Classes

Table 10

A Comparison of Male and Female Nursing Students

Variable	Males			Females			Diff.
	No.	Mean	S D	No.	Mean	S D	
Age	9	33.50	8.42	72	25.10	9.36	8.40**
No. of children	9	.77	.91	72	.81	1.37	.04
No. of brothers	9	1.88	1.66	72	.98	1.08	.90
No. of sisters	9	.77	.78	72	1.23	1.21	.46
No. of siblings	9	2.66	2.00	72	2.22	1.74	.44
Father's education	9	9.11	2.51	72	9.58	1.93	.47
Mother's education	9	9.00	1.88	72	10.06	1.74	1.06
Sem. prior to adm.	9	2.11	.87	72	1.66	1.83	.45
Sem. of nursing	9	4.22	1.81	72	4.48	2.26	.26
SCAT - V	8	43.00	10.75	71	38.96	7.30	4.04**
SCAT - Q	8	39.00	5.26	71	30.79	7.19	8.21**
SCAT - T	8	80.12	13.29	71	68.37	11.60	11.75**
NLN A & P	7	80.50	13.07	57	75.91	10.69	4.59
NLN Micro	7	78.35	14.13	57	76.02	11.95	2.33
NLN Ob	7	73.21	7.66	54	78.83	8.68	5.62
NLN Nsg Ch	6	77.50	9.79	53	74.21	9.99	3.29
NLN Psychiatric	6	74.50	9.64	53	69.68	9.29	4.82
NLN M & S	6	80.50	11.35	50	78.94	8.94	1.56
NLN Diet	6	73.49	7.48	51	80.20	10.03	6.71
State Ob	6	469.48	84.88	50	569.22	112.42	99.74**
State Nsg Ch	6	496.48	96.93	50	540.06	81.54	43.68**
State Psychiatric	6	541.46	114.15	50	533.58	86.72	7.88
State Med	6	487.46	100.60	50	518.46	84.88	31.00**
State Surg	3	541.46	114.15	50	553.58	93.79	12.12
H S GPA	3	2.62	.41	60	2.67	.46	.05
H S Chem	3	1.00	.81	48	2.08	.75	1.08
H S Biology	1	3.00	0.00	48	2.79	.81	.21
H S Math	2	2.00	0.00	18	2.66	.74	.66
H S Algebra	4	2.00	.70	51	2.25	.73	.25
H S English	4	2.00	.70	55	2.61	.52	.61
Pre-Nursing GPA	9	2.52	.41	44	2.48	.51	.04
Total Coll. GPA	9	2.68	.49	72	2.54	.50	.14
A & P	8	2.50	.50	67	2.56	.77	.06
Micro	8	2.62	.69	62	2.63	.78	.01
English 1a	4	2.25	.43	36	2.33	.88	.08
Ob	7	2.71	.88	56	2.94	.69	.23
Nsg Ch	8	2.75	.66	55	2.71	.67	.04
M & S	9	2.66	.66	68	2.51	.88	.15
Diet	7	2.58	.90	53	2.54	.76	.04
Chem	4	2.75	.44	13	2.15	.66	.60

*=P < .05
**=P < .01

Table 11

A Comparison of Nursing Students Who Completed the Program With Those Who Did Not Complete It

Variable	Completed			Have Not Completed			Diff.
	No.	Mean	S D	No.	Mean	S D	
Age	55	27.30	10.24	24	23.14	7.60	4.16
No. of children	55	1.07	1.45	24	.29	.84	.78
No. of brothers	55	1.16	1.14	24	.95	1.33	.21
No. of sisters	55	1.21	1.23	24	1.04	1.05	.17
No. of siblings	55	2.38	1.66	24	2.00	2.02	.38
Father's education	55	9.27	1.87	24	9.91	2.21	.64
Mother's education	55	9.76	1.67	24	10.45	1.91	.69
Sem. prior to adm.	55	1.74	1.86	24	1.45	1.41	.29
Sem. of nursing	55	5.78	1.03	24	1.45	.86	4.33**
SCAT - V	53	39.58	7.64	24	38.16	8.36	1.42
SCAT - Q	53	31.62	7.20	24	32.18	7.88	.56
SCAT - T	53	70.78	10.78	24	68.19	13.93	2.59
NLN A & P	53	77.08	11.04	8	73.00	11.10	4.08
NLN Micro	54	77.86	11.46	8	65.50	9.48	12.36
NLN Ob	55	78.82	8.64	4	70.00	7.74	8.82
NLN Nsg Ch	55	75.56	8.82	2	59.50	12.00	16.26
NLN Psychiatric	55	70.90	8.94	2	53.50	6.00	17.40
NLN M & S	55	79.36	9.12	0			
NLN Diet	55	79.54	10.08	0			
State Ob	55	560.58	113.40	0			
State Nsg Ch	55	537.36	87.70	0			
State Psychiatric	55	535.20	90.18	0			
State Med	55	516.30	86.94	0			
State Surg	55	535.20	96.66	0			
H S GPA	44	2.75	.47	18	2.65	.37	.10
H S Chem	35	2.06	.79	15	1.94	.85	.12
H S Biology	33	2.88	.80	16	2.63	.78	.25
H S Math	11	2.46	.65	8	2.63	.69	.17
H S Algebra	39	2.31	.75	15	2.07	.67	.24
H S English	39	2.57	.59	18	2.67	.47	.10
Pre-Nursing GPA	37	2.60	.52	14	2.17	.25	.43**
Total Coll. GPA	55	2.82	.47	23	1.96	.62	.86**
A & P	55	2.77	.65	18	1.89	.65	.88**
Micro	55	2.73	.77	13	2.16	.66	.57*
English 1a	22	2.55	.78	17	2.06	.87	.49*
Ob	55	3.02	.70	7	2.29	.45	.73*
Nsg Ch	54	2.78	.68	7	2.43	.49	.35
M & S	55	2.82	.68	20	1.75	.82	1.07**
Diet	55	2.60	.80	3			

*=P < .05
**=P < .01

similar in most respects. It is interesting to note that age and SCAT-Verbal scores, which were significantly related to State Board scores, failed to differentiate these two groups. Another significant predictor of State Board scores, pre-nursing GPA, does show the graduates to be superior. Significant differences on grades are expected since they are related to a student's longevity.

Age groups. Since age is correlated with both State Board scores and nursing grades, it is not surprising to find many variables on which students under 21 differ from those over 21 years of age as shown in Table 12. The older students had spent more time studying pre-nursing courses. Although older students did not have higher SCAT-Verbal scores or higher high school or pre-nursing grades, they did score significantly higher on all NLN Achievement Tests and on all State Board Examinations. Their superiority was especially obvious on the obstetrics, psychiatric, and surgical parts.

Marital groups. It was shown earlier that marital status was related to completion of the nursing program. A bi-serial correlation coefficient between marital status and State Board scores reached .43. This seems to indicate the potential predictive value of marital status. However, since marital status is highly related to age (phi = .69), the real relationship between marital status and State Board performance drops to .24 when age is held constant. Hence, marital status is not as fruitful a predictor as would appear.

Table 13 presents a comparison of single and married students. Similar to older versus younger students, married students differ only on one criterion variable, where they are superior to single students.

Table 12

A Comparison of Nursing Students Under 21 Years of Age
With Those Over 21

Variable	Under 21			Over 21			Diff.
	No.	Mean	S D	No.	Mean	S D	
No. of children	40	0.000	0.000	41	1.560	1.514	
No. of brothers	40	1.000	1.012	41	1.121	1.328	.121
No. of sisters	40	1.128	1.090	41	1.268	1.269	.140
No. of siblings	40	2.128	1.488	41	2.390	2.034	.262
Father's education	40	9.538	1.823	41	9.585	2.163	.075
Mother's education	40	10.461	1.677	41	10.536	1.740	.005
Sem. prior to adm.	40	.666	1.045	41	2.731	1.725	2.065**
Sem. of nursing	40	4.435	2.262	41	4.439	2.187	.004
SCAT - V	38	38.128	8.150	40	40.700	8.724	2.572
SCAT - Q	38	33.812	5.756	40	29.400	8.220	4.412**
SCAT - T	38	70.311	10.374	40	68.925	13.993	1.386
NLN A & P	29	71.908	8.172	35	80.410	11.856	8.502**
NLN Micro	29	72.532	9.588	35	79.384	13.278	6.852**
NLN Ob	29	75.430	8.520	31	80.980	8.172	5.550**
NLN Nsg Ch	28	70.852	8.976	30	78.100	9.840	7.248**
NLN Psychiatric	28	66.568	8.934	30	73.498	8.808	6.930**
NLN M & S	26	75.418	8.412	29	82.258	9.102	6.840**
NLN Diet	27	77.050	8.928	29	82.048	10.410	4.998*
State Ob	26	522.078	95.904	29	593.898	119.232	71.820**
State Nsg Ch	26	517.920	64.476	29	594.240	97.308	31.320**
State Psychiatric	26	495.078	80.298	29	571.596	83.754	76.518**
State Med	26	503.394	83.700	29	526.884	90.072	23.490**
State Surg	26	495.078	78.894	29	565.890	97.632	70.902**
H S GPA	34	2.759	.411	30	2.578	.489	.182
H S Chem	33	2.091	.711	18	1.889	.936	.202
H S Biology	31	2.742	.841	18	2.889	.737	.147
H S Math	9	2.556	.684	11	2.637	.771	.081
H S Algebra	31	2.323	.778	24	2.125	.665	.198
H S English	34	2.618	.543	25	2.520	.574	.088
Pre-Nursing GPA	14	2.459	.311	38	2.521	.547	.062
Total Coll. GPA	39	2.348	.601	40	2.783	.616	.435
A & P	38	2.290	.684	36	2.862	.713	.472
Micro	32	2.438	.704	37	2.811	.799	.373
English 1a	20	2.150	.726	20	2.500	.921	.350
Ob	29	2.621	.551	34	3.206	.718	.585
Nsg Ch	30	2.467	.561	32	2.969	.683	.502
M & S	38	2.237	.741	38	2.843	.874	.606
Diet	28	2.286	.451	31	2.807	.930	.521
Chem	3	2.000	0.000	14	2.358	.717	.358

*: $P < .05$
**: $P < .01$

Table 13

A Comparison of Nursing Students Who Were Single
With Those Who Were Married

Variable	Single			Married			Diff.
	No.	Mean	S D	No.	Mean	S D	
Age	44	20.22	4.84	26	35.62	7.28	15.40**
No. of children	44			26	2.19	1.44	
No. of brothers	44	.93	.94	26	1.30	1.51	.37
No. of sisters	44	1.15	1.12	2	.96	1.09	.19
No. of siblings	44	2.09	1.47	26	2.26	1.95	.17
Father's education	44	9.72	2.0	26	9.07	1.87	.63
Mother's education	44	10.36	1.75	26	9.34	1.66	1.02
Sem. prior to adm.	44	1.27	1.48	26	2.30	1.56	1.03**
Sem. of nursing	44	3.88	2.28	26	5.15	1.93	1.27*
SCAT - V	43	37.86	6.12	26	40.86	9.24	3.00
SCAT - Q	43	32.66	6.48	26	30.70	7.66	1.96
SCAT - T	43	68.26	11.62	26	71.27	12.53	3.01
NLN A & P	31	72.64	9.18	24	80.20	12.60	7.56**
NLN Micro	31	73.54	11.10	23	79.54	13.50	6.00**
NLN Ob	29	74.80	7.62	22	82.12	8.64	7.32**
NLN Nsg Ch	28	69.34	9.48	22	80.50	8.40	11.16**
NLN Psychiatric	28	65.92	8.76	22	74.20	7.98	9.28**
NLN M & S	25	73.90	7.38	22	84.04	8.64	11.14**
NLN Diet	26	77.02	9.06	22	80.70	10.92	3.68
State Ob	25	502.26	90.75	22	566.35	120.45	64.09**
State Nsg Ch	25	496.50	70.95	22	535.00	94.60	38.50**
State Psychiatic	25	481.10	73.70	22	552.05	85.25	70.95**
State Med	25	485.50	81.95	22	507.50	95.15	22.00**
State Surg	25	485.50	74.25	22	554.80	103.95	69.30**
H S GPA	36	2.99	.37	18	2.52	.53	.47
H S Chem	32	2.07	.70	11	1.91	.99	.16
H S Biology	32	2.69	.81	9	2.89	.87	.20
H S Math	12	2.59	.76	7	2.58	.73	.01
H S Algebra	32	2.19	.73	14	2.08	.70	.11
H S English	36	2.56	.50	14	2.43	.62	.13
Pre-Nursing GPA	22	2.40	.31	26	2.67	.54	.27
Total Coll. GPA	43	2.31	.59	26	2.99	.52	.68
A & P	40	2.30	.71	25	2.84	.73	.54
Micro	35	2.43	.69	25	2.88	.82	.45
English la	25	2.14	.80	12	2.84	.80	.70
Ob	30	2.64	.55	24	3.21	.71	.57
Nsg Ch	30	2.47	.56	23	2.96	.75	.49
M & S	42	2.17	.75	24	3.05	.73	.88
Diet	28	2.25	.57	23	2.87	.90	.62

*=P < .05
**=P < .01

Intra - Group Correlational Analyses

Since both age and marital status seem to be related to success in nursing, they were given additional attention. Separate correlational analyses were completed for all students under 21 years of age, for those over 21 years of age, for married students, and for single students.

Age groups. Tables 14 and 15 present intercorrelation matrices for students under and for those over 21 years of age respectively. All correlation coefficients not meeting the .05 level of confidence were deleted. Those meeting or exceeding the .05 level are in black print and those meeting the .01 level are in red numerals.

Considering the criterion of State Board scores, it can be seen that the SCAT is a fair predictor for the young students (.40-.50) in comparison to the non-significant coefficients obtained for the older students. High school GPA is equally unrelated to State Board scores for both groups. Grades in high school chemistry is substantially related to State Boards for younger students; whereas, not enough of the older students completed chemistry for analysis. The opposite is true for pre-nursing GPA. Not enough younger students took pre-nursing courses. Whereas, such courses were moderately predictive for older students. Grades in specific pre-nursing courses, especially anatomy and physiology, were even more predictive than an overall GPA.

Marital status groups. Tables 16 and 17 present intercorrelation matrices for all variables for single and married students respectively. Remembering the strong relationship between age and marital status, i.e. married students being older, it is not surprising to see that SCAT is much more highly related to State Board scores for single than for married students.

	Bros.	Sis.	Sibl.	Father's ed.	Mother's ed.	Sem. prior to ad.	Sem. of nsg.	SCAT - V	SCAT - Q	SCAT - T	NLN - A & P	NLN - Micro	NLN - Ob.	NLN - Nsg. of ch.	NLN - Psy.	NLN - M & S	NLN - Diet.	St. Bd. - Ob.	St. Bd. - Nsg. of ch.
mber of brothers																			
mber of sisters																			
mber of siblings	68	73																	
ther's education																			
ther's education			39																
mesters prior to admission				-41															
mesters of nursing																			
AT - Vocabulary		43	44																
AT - Quantitative							40												
AT - Total						-38	50	73											
N - Anatomy & Physiology										40									
N - Microbiology	38										58								
N - Obstetrics						-45	51	40		59	48	38							
N - Nursing of children										47	66	59	45						
N - Psychiatrics											47		43	60					
N - Medical & Surgical																			
N - Dietetics							40			41	48		62	42		49			
ate Board - Obstetrics							51			41	63		63	50	45		60		
ate Board - Nursing of children							48	43		50	40	50	46	49				54	
ate Board - Psychiatrics							50	45		53			57	40			46	58	44
ate Board - Medical						50				58	44		50	55			47	63	65
ate Board - Surgical							56			46	61		58	44	42		54	82	58
gh School Grade Point Average					-37	49		43	42										
gh School - Chemistry							60	56		71	55	45	57	80	48		71	48	58
gh School - Biology								37		46			55	46					54
gh School - Algebra	42	46	63			39								24					
gh School - English								47		52									
lley College Grade Point Average					-34	53					39	51	44	49				39	
ade - Anatomy & Physiology						44					46	41	48	50			45	46	50
ade - Microbiology																			
ade - English																			
ade - Obstetrics																		48	38
ade - Nursing of children									37				51					48	
ade - Medical & Surgical											54	68	50	61					
ade - Dietetics							42				54	48	48	42			55	63	

Table 14

Intercorrelations of 35 Variables

For All Students Under 21 Years of Age

Black = P < .05

Red = P < .01

	NLN - A & P	NLN - Micro	NLN - Ob.	NLN - Nsg. of ch.	NLN - Psy.	NLN - M & S	NLN - Diet.	St. Bd. - Bd.	St. Bd. - Ob.	St. Bd. - Nsg. of ch.	St. Bd. - Psy.	St. Bd. - Med.	St. Bd. - Surg.	H.S. G.P.A.	H.S. - Chem.	H.S. - Biol.	H.S. - Alg.	H.S. - Eng.	V.C. G.P.A.	Gr. - A & P	Gr. - Micro.	Gr. - Eng.	Gr. - Ob	Gr. - Nsg. of ch.	Gr. - M & S	Gr. - Diet.
NLN - A & P																										
NLN - Micro	38																									
NLN - Ob.	59	45																								
NLN - Nsg. of ch.		43	60																							
NLN - Psy.																										
NLN - M & S		62	42		49																					
NLN - Diet.		63	50	45		60																				
St. Bd. - Bd.	50	46	49				54																			
St. Bd. - Ob.		57	40			46	58	44																		
St. Bd. - Nsg. of ch.		50	55			47	63	65	69																	
St. Bd. - Psy.		58	44	42		54	82	58	61	68																
St. Bd. - Med.									48																	
St. Bd. - Surg.	45	57	80	48		71	48	58	53	56	43															
H.S. G.P.A.		55	46					54		60		56														
H.S. - Chem.			24									42														
H.S. - Biol.									52			70	40													
H.S. - Alg.	51	44	49				39					62		49	49	40										
H.S. - Eng.	41	48	50			45	46	50	40	57	41	70	37	57	37	42										
V.C. G.P.A.												70					80									
Gr. - A & P																	43	61								
Gr. - Micro.							48	38																		
Gr. - Eng.		51					48			41	45						44	54								
Gr. - Ob	68	50	61							47		56	35	60				53								
Gr. - Nsg. of ch.	48	48	42			55	63			45	49		50				78	84	50							
Gr. - M & S																		47								
Gr. - Diet.																	55	42	46							

	Age	Sex	No. of ch	No. of bros.	No. of sis.	No. of sibl.	Father's ed.	Mother's ed.	Sem. prior to admis.	Sem. of nsg.	SCAT - V	SCAT - Q	SCAT - T	NLN - A & P	NLN - Micro.	NLN - Ob.	NLN - Nsg. of ch.	NLN - Psy.
Age																		
Sex																		
Number of children	55	30																
Number of brothers																		
Number of sisters																		
Number of siblings				79	77													
Father's education	-32			-34		-32												
Mother's education				-33	-44	-49	51											
Semesters prior to admission																		
Semesters of nursing		41					-32											
SCAT - Vocabulary																		
SCAT - Quantitative		-55																
SCAT - Total		-43									75	75						
NLN - Anatomy & Physiology											38	49	56					
NLN - Microbiology											54		54	77				
NLN - Obstetrics		45					-42							41	47			
NLN - Nursing of children													51	45		61		
NLN - Psychiatrics											63		59		44		37	
NLN - Medical & Surgical											54		58	56	55	71	78	61
NLN - Dietetics														44	46	63	38	39
State Board - Obstetrics		48												42		64	54	36
State Board - Nursing of children														48	45	74	64	43
State Board - Psychiatrics														47	48	48	50	
State Board - Medical										48		40	52	57		69	57	57
State Board - Surgical														50	42	73	67	42
High School Grade Point Average																		
High School - Algebra																		
High School - English							43											
Pre-Nursing Grade Point Average	36								39							39	38	
Valley College Grade Point Average	48					-39			52						37	61	60	
Grade - Anatomy & Physiology														61	55	39		
Grade - Microbiology									53					41	49	38		41
Grade - English									62									
Grade - Obstetrics	42		36												38	37		
Grade - Nursing of children														45	48	57	66	
Grade - Medical & Surgical	40					-33			40					42	45	59	47	
Grade - Dietetics	41											37	44	38		59	49	

Table 15

Intercorrelations of 37 Variables

For All Students Over 21 Years of Age

Black = P <.05
Red = P <.01

	SCAT - Q	SCAT - T	NLN - A & P	NLN - Micro.	NLN - Ob.	NLN - Nsg. of ch.	NLN - Psy.	NLN - M & S	NLN - Diet	St. Bd. - Ob.	St. Bd. - Nsg. of ch.	St. Bd. - Psy.	St. Bd. - Med.	St. Bd. - Surg.	St. Bd. G.P.A.	H.S. - Alg.	H.S. - Eng.	Pre-Nsg. G.P.A.	U.C. G.P.A.	Gr. - A & P	Gr. - Micro.	Gr. - Eng.	Gr. - Ob.	Gr. - Nsg. of ch.	Gr. - M & S	Gr. - Diet.
SCAT - Q																										
SCAT - T	5																									
NLN - A & P	9	56																								
NLN - Micro.		54	77																							
NLN - Ob.			41	47																						
NLN - Nsg. of ch.	51	45		61																						
NLN - Psy.	59		44			37																				
NLN - M & S	58	56	55	71		78	61																			
NLN - Diet		44	46	63		38	39	52																		
St. Bd. - Ob.		42		64		54	36	74	63																	
St. Bd. - Nsg. of ch.		48	45	74		64	43	70	65	74																
St. Bd. - Psy.		47	48	48		50		69	37	49	61															
St. Bd. - Med.	40	52	57	69		57	57	74	73	59	68	55														
St. Bd. - Surg.		50	42	73		67	42	78	60	77	84	60	83													
St. Bd. G.P.A.																										
H.S. - Alg.																										
H.S. - Eng.																										
Pre-Nsg. G.P.A.																										
U.C. G.P.A.																										
Gr. - A & P																										
Gr. - Micro.																										
Gr. - Eng.																										
Gr. - Ob.																										
Gr. - Nsg. of ch.																										
Gr. - M & S																										
Gr. - Diet.																										

	Age	Sex	No. of ch	No. of bros.	No. of sis.	No. of sibl.	Father's ed.	Mother's ed.	Sem. prior to admis.	Sem. of nsg.	SCAT - V	SCAT - Q	SCAT - T	NLN - A & P	NLN - Micro.	NLN - Ob	NLN - Nsg. of ch.	NLN - Psy.	NLN - M & S
Age																			
Sex	91																		
Number of children																			
Number of brothers																			
Number of sisters																			
Number of siblings				64	77														
Father's education																			
Mother's education																			
Semesters prior to admission	36						-38												
Semesters of nursing																			
SCAT - Vocabulary					31	39													
SCAT - Quantitative									-41										
SCAT - Total									-44		40	77							
NLN - Anatomy & Physiology							40												
NLN - Microbiology														62					
NLN - Obstetrics											51			38					
NLN - Nursing of children													39	41					
NLN - Psychiatrics						40								46					
NLN - Medical & Surgical					-46														
NLN - Dietetics														54		51	42		64
State Board - Obstetrics											45			44		56		47	
State Board - Nursing of children									-58		43	59	59						
State Board - Psychiatrics	42	-41														50			
State Board - Medical											55	50	61	42		46	45		
State Board - Surgical											55		41	50		58	43	49	
High School Grade Point Average										49		40	38						
High School - Chemistry											56	47	67	60	49	52	67		
High School - Biology																			
High School - Math																			
High School - Algebra					39	41				36									
High School - English												34	44						
Pre-Nursing Grade Point Average																			
Valley College Grade Point Average										56					44		47		
Grade - Anatomy & Physiology										45				45	36	37			
Grade - Microbiology															37				
Grade - English														52	73				
Grade - Obstetrics														50	42	37			
Grade - Nursing of children														40		49			
Grade - Medical & Surgical										50				48	71	38	42		
Grade - Dietetics	53	-57					38				38		38	53	43				

Table 16

Intercorrelations of 40 Variables

For All Unmarried Students

Black = P < .05

Red = P < .01

	SCAT - T	NLN - A & P	NLN - Micro.	NLN - Ob	NLN - Nsg. of ch.	NLN - Psy.	NLN - M & S	NLN - Diet.	St. Bd. - Ob	St. Bd. - Nsg. of ch.	St. Bd. - Psy.	St. Bd. - Med.	St. Bd. - Surg.	H.S. G.P.A.	H.S. - Chem.	H.S. - Biol.	H.S. - Math	H.S. - Alg.	H.S. - Eng.	Pre-Nsg. G.P.A.	V.C. G.P.A.	Gr. - A & P	Gr. - Micro.	Gr. - Eng.	Gr. - Ob	Gr. - Nsg. of ch.	Gr. - M & S	Gr. - Diet.
SCAT - T		62	38	41	46	54	51	42	64																			
NLN - A & P			44	56	47	54																						
NLN - Micro.	59						44																					
NLN - Ob				50		41																						
NLN - Nsg. of ch.	61	42		46	45	54	58	47	43																			
NLN - Psy.	41	50		58	43	49	56	80	48	54	59																	
NLN - M & S	38																											
NLN - Diet.	67	60	49	52	67		76				67																	
St. Bd. - Ob											64		45	37														
St. Bd. - Nsg. of ch.															72													
St. Bd. - Psy.													55															
St. Bd. - Med.	44										49		50															
St. Bd. - Surg.			44		47								55	50	44		38											
H.S. G.P.A.		45	36	37			40				49		58	37	58		37				71							
H.S. - Chem.			37																		39	64						
H.S. - Biol.		52	73											58							63	48	55					
H.S. - Math		50	42	37				47													42	49		51				
H.S. - Alg.		40		49				46		44	49	54										42			54			
H.S. - Eng.		48	71	38	42						47		46		49						77	76	50	59	63	42		
Pre-Nsg. G.P.A.	38	53	43				64	40	40		50	60	46	65	57						46			75	38	38	52	

	Age	Sex	No. of ch	No. of bros.	No. of sis.	No. of sibl.	Father's ed.	Mother's ed.	Semesters prior to ad.	Sem of nsg.	SCAT - V	SCAT - Q	SCAT - T	NLN - A & P	NLN - Micro.	NLN - Ob.	NLN - Nsg. of ch.	NLN - Psy.
Age																		
Sex																		
Number of children	41	39																
Number of brothers																		
Number of sisters																		
Number of siblings				83	64													
Father's education																		
Mother's education							62											
Semesters prior to admission																		
Semesters of nursing																		
SCAT - Vocabulary																		
SCAT - Quantitative		-48																
SCAT - Total											86	71						
NLN - Anatomy & Physiology										-51			49					
NLN - Microbiology									-65		54		59	90				
NLN - Obstetrics														62	64			
NLN - Nursing of children											51		55	63	63	73		
NLN - Psychiatrics										45	63		49				51	
NLN - Medical & Surgical											51		43	54	60	69	74	50
NLN - Dietetics		46													52	72	48	
State Board - Obstetrics		56												48		65	60	
State Board - Nursing of children		47												55	57	81	63	
State Board - Psychiatrics														55	51	53	44	
State Board - Medical											46			48	60	76	63	55
State Board - Surgical														48	52	72	62	
High School Grade Point Average																		
High School - Chemistry		67									-73		-85					-77
High School - Biology							70											
High School - Math												-80						
High School - Algebra																		
High School - English																		
Pre-Nursing Grade Point Average																		
Valley College Grade Point Average														52	50	64	58	
Grade - Anatomy & Physiology														64	66	44	44	
Grade - Microbiolgoy										44				41	46		49	
Grade - English											82		64		75			
Grade - Obstetrics														41	43			
Grade - Nursing of children														48	43	65	70	
Grade - Medical & Surgical														45		67	65	
Grade - Dietetics														45	47	68	54	

Table 17

Intercorrelations of 40 Variables
For All Married Students

Black = P < .05
Red = P < .01

	NLN - A & P	NLN - Micro.	NLN - Ob.	NLN - Neg. of ch.	NLN - Psy.	NLN - M & S	NLN - Diet.	St. Bd. - Ob.	St. Bd. - Neg. of ch.	St. Bd. - Psy.	St. Bd. - Med.	St. Bd. - Surg.	H.S. G.P.A.	H.S. - Chem.	H.S. - Biol.	H.S. - Math	H.S. - Alg.	H.S. - Eng.	Pre-Neg. G.P.A.	V.C. G.P.A.	Gr. - A & P	Gr. - Micro.	Gr. - Eng.	Gr. - Ob.	Gr. - Neg. of ch.	Gr. - M & S	Gr. - Diet.	Gr. - Chem.
	90																											
	62	64																										
	63	63	73																									
				51																								
	54	60	69	74	50																							
		52	72	48		53																						
	48		65	60		74	65																					
	55	57	81	63		73	71	75																				
	55	51	53	44		68	48	57	64																			
	48	60	76	63	55	75	75	72	76	64																		
	48	52	72	62		79	57	76	83	60	86																	
5					-77			72																				
								63					64	62														
						44					52																	
	52	50	64	58		55	49	52	52	61	56								83									
	64	66	44	44		62	54	47	61	60	47					78			74	81								
	41	46		49					55	53									79	71	64							
		75				80				92	87								62			65						
	41	43					43		60										63	77	78	61						
	48	43	65	70		66	58	70	64	53	71	69							65	79	62	57		58				
	45		67	65		57	60	64	67	58	72	69							72	82	64	63		55	93			
	45	47	68	54		43	64	50	59	54	70	58							76	85	66	77	70	58	72	78		

High school GPA is not predictive for either group. High school chemistry grade is moderately related to State Boards for both groups. Since sub-samples are small, high correlations are needed to reach statistical significance. An average of pre-nursing grades is not predictive of State Board performance for either group. However, anatomy and physiology grades are highly related to State Board scores for the married group.

Summary of Findings

1. Moderately high (.40-.60) relationships were found among the criterion variables of State Board scores, NLN scores, and grades for nursing courses.

2. Personal data taken from application blanks were unrelated to success in nursing.

3. Low to moderate relationships (.20-.50) were found between predictors such as age, SCAT-Verbal, pre-nursing courses, high school chemistry, and the criteria of State Board scores and nursing grades.

4. High school grades except in science were generally unrelated to success in nursing courses or to State Boards.

5. Quantitative ability showed only a negligible relationship to State Board performance or grades in nursing.

6. A significantly greater proportion of married students finished the program than single students.

7. Male applicants were older and had higher SCAT scores, yet scored lower on three parts of the California State Board Examinations.

8. Nursing school graduates were not signifiicantly different from dropouts in any essential way.

9. Although older students did not differ from younger students on verbal ability or pre-nursing grades, they performed significantly higher

on all parts of the State Board Examinations.

10. Married students differed from the single students only on State Board scores where they were superior.

DISCUSSION OF FINDINGS

The above findings are consonant with those reported in the literature on nursing selection. In contrast to this study, most of the studies have been more concerned with grades in nursing courses than with State Board Examinations. In a review of 111 unpublished and 77 published studies related to nursing selection, Taylor (1963) found only one study reporting a multiple correlational analysis using a criterion other than nursing grades.

In studies using academic nursing grades as a criterion, Taylor found that tests of verbal comprehension were the best single predictors, most coefficients being in the .60's. There was great variability between tests and among studies using the same tests. The most stable results were found in studies using weighted nursing selection batteries such as those of the Psychological Corporation and the National League For Nursing. Multiple correlations found in many studies range from .34 to .77; many of these being in the .60's.

In predicting State Board scores, the multiple correlation of .54 reported previously is not necessarily the highest obtainable. Since the regression analysis was completed on preliminary data, the four predictors are not necessarily those which would yield the highest coefficient. Since other studies have not used State Board performance as a criterion in multiple regression analyses, the multiple correlation in this study cannot be appropriately evaluated. However, weighted batteries are reported to be very useful in predicting State Board performance. The best one of these

appears to be the National League For Nursing,Pre-Nursing and Guidance Test Battery. Most coefficients found with this battery are in the high .60's and .70's. Consideration may be given to the use of such a battery for selection at San Bernardino Valley College.

Whereas high school GPA was the most valid predictor in Garrett's study (1960), it was not related to either State Board performance or with the more logical criterion of grades in nursing in this investigation. The predictive value of high school GPA in nursing is sporadic and unstable at best (Taylor, 1963). It is often true, however, as in this study and as Haney (1962) found, that grades in certain science courses, especially chemistry, are more predictive than average GPA.

The relationship between verbal comprehension and success in nursing has long been recognized. Taylor found that tests such as the Otis ACE Psychological Examination and Coop Total English typically correlate in the .60's with State Board scores. The moderate relationship found in this study using the SCAT-Verbal is typical although coefficients have been reported as high as .69 (Anderson, 1965).

In addition to a verbal comprehension factor, Haney (1959) also found a mathematics factor associated with success in nursing. Garrett's study, alluded to previously, also found mathematics to be a useful predictor. For San Bernardino Valley College students, however, neither the SCAT-Quantitative nor high school mathematics grades were related to nursing success.

It is not likely that the findings and implications of this study would elicit the compliment so coveted recently; that is, "exciting." Indeed, the strength of the relationships found hardly exceed the expectations of any bonafide pessimistic researcher. Nor is it encouraging to think that this study has dealt with the more measurable and predictable

traits of humans; that is, the cognitive or intellectual. Clinical nursing behavior, probably more highly related to temperment and personality, is not treated here. Attempts to identify predictors of clinical behavior usually meet with failure or dubious success. (Taylor, 1965)

Criticism is usually leveled at tests for failing to predict academic or clinical success more accurately. Much of this critical energy should be channeled into constructing more appropriate criteria. The criteria most often used, grades or State Board Examinations, usually are sorely lacking in the quality demanded of any criterion; i.e. stability or reliability.

The greatest untreated myopia of education, perhaps nursing education to a lesser extent, is the failure to distinguish between actual success in nursing and training standards or progress measures such as State Board scores or nursing grades. This is tragic because grades are generally unrelated to actual job performance (Hoyt , 1965.) It is not surprising then to see that State Board scores are also unrelated to a nurse's ability to care for patients (Taylor, 1965.)

Therefore, in spite of its appearances of precision, the regression equation reported in this paper is not to be rigorously applied to selection problems. . If it were, many potentially good nursing practitioners would not survive the entrance examinations. When combined with other factors such as personality traits, the formula may become useful. The next step, a giant step, is to quantify the personality factors which hopefully will better predict clinical behavior and actual job success.

SUMMARY

This study served the dual objectives of evaluating the performance of the past four graduating classes as well as identify variables which are related to success in the San Bernardino Valley College nursing program.

Means, standard deviations and correlation coefficients for a variety of personal, intellectual, and achievement data for the total sample and subgroups divided on class, age, sex, marital status, and completion versus withdrawal from the program are presented and analyzed. A regression analysis based on four variables found to be moderately related to success on State Boards is presented and interpretated. These variables were SCAT-Verbal score, pre-nursing GPA, age, and high school chemistry grades.

Findings were discussed in the light of other studies. Implications of the findings and suggestions for further research were presented.

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